

## BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 19 1957

## EPIDEMIC MYALGIC ENCEPHALOMYELITIS

A number of outbreaks of an illness in which encephalomyelitis is a prominent feature and which, in the early stages, could be confused with poliomyelitis have recently been observed in different parts of the world. From published reports it is clear that no clue to the cause has yet been obtained, so that any assumption that such outbreaks are of the same aetiology is purely hypothetical. Nevertheless, in many of the outbreaks the clinical and epidemiological pattern is so similar that it seems justifiable at the present to consider them as a clinical entity. Mention was made of these outbreaks in a review of virus meningitis and encephalomyelitis in the columns of this *Journal* earlier this year,<sup>1</sup> and in the opening pages of this week's issue there appears a report from the medical staff of the Royal Free Hospital on the 1955 outbreak which affected all the hospitals in the Royal Free Group and which became known throughout London and beyond as "Royal Free disease." This authoritative account will be of value in putting into perspective the perplexing features of this infection.

Much of epidemiological interest has already been discussed in a report published earlier this year by N. Crowley, M. Nelson, and S. Stovin<sup>2</sup> from the Royal Free Hospital. The first cases occurred in July, 1955, and by the end of November over 300 cases had been seen at eight hospitals comprising the Royal Free teaching group. Of these 300, 292 were members of the nursing, medical, domestic, and ancillary staffs. Although the main hospital in Gray's Inn Road was closed ten days after the start of the outbreak, only 12 patients developed symptoms; and in an area very much aware of the "disease" only a few sporadic cases were encountered. The earlier cases at Gray's Inn Road were followed by secondary cases appearing over the next 10 to 12 weeks among the staff at the associated hospitals, all of which were situated within a few miles of each other (in the Metropolitan Borough of St. Pancras and its immediate neighbourhood). A noticeably higher attack rate was observed

among resident staff (19%) than in non-residents (4.7%) and among nurses and the domestic workers and orderlies closely associated with them. Senior nurses seemed to be particularly badly hit, but student nurses at the preliminary training school were also affected. In a further paper published this week, (p. 904) Drs. D. Geffen and Susan M. Tracy report a further outbreak at the same training school in May, 1956, with features similar to those of the previous year. On this occasion the training school was closed, and no secondary spread was reported. Thus the disease appears to be highly infectious in closed populations, and hospitals evidently provide suitable soil for such infections as those observed at the Middlesex Hospital<sup>3</sup> and at Coventry a few years ago.<sup>4</sup> An outbreak among nurses in a private psychiatric hospital in Washington, D.C., is yet another example<sup>5</sup>: In this there were 41 cases, of whom 39 were nurses, 29 being student nurses. Only one patient was affected. A report<sup>6</sup> from Iceland of a similar infection indicated that schoolchildren were predominantly affected by the disease.

Fully developed cases of this disease, as seen at the Royal Free Hospital, showed signs of a generalized infection with widespread involvement of the central nervous system and enlargement of the superficial lymph nodes. But marked variations were encountered from case to case not only in severity but in the evolution and whole course of the disease. The signs and symptoms in individual patients varied from day to day, particularly during the subacute stage. In this latter respect, and indeed in many others, myalgic encephalomyelitis differs from poliomyelitis, but, even so, the distinction between the two may not always be clear-cut, particularly in the early stages. The commonest prodromal symptoms of the patients at the Royal Free Hospital were headache, malaise, sore throat, and occasionally gastro-intestinal disturbance—symptoms common to a number of infectious diseases, but here the malaise and headache often appeared to be out of proportion to the moderate fever. In most cases the major illness developed as an aggravation of these symptoms with, in addition, the development of pain, muscle weakness, and other signs of involvement of the central nervous system. In the early stages paresis was accompanied by hypotonia and severe pain on movement; the weakness was often hemiplegic in distribution, later becoming more extensive but constantly fluctuating. True flaccid paralysis of the lower-motor-neurone type, with wasting and loss of tendon reflexes as seen in poliomyelitis, was not observed. Reflexes were usually normal, occasionally exaggerated. Another unusual feature was a peculiar jerking on

<sup>1</sup> *Brit. med. J.*, 1957, 1, 811.

<sup>2</sup> Crowley, N., Nelson, M., and Stovin, S., *J. Hyg. (Lond.)*, 1957, 55, 102.

<sup>3</sup> Acheson, E. D., *Lancet*, 1954, 2, 1044.

<sup>4</sup> Macrae, A. D., and Galpine, J. F., *ibid.*, 1954, 2, 350.

<sup>5</sup> Shelokov, A., Habel, K., Verder, E., and Welsh, W., *New Engl. J. Med.*, 1957, 257, 345.

<sup>6</sup> Sigurdsson, B., *et al.*, *Amer. J. Hyg.*, 1950, 55, 222.

<sup>7</sup> Poskanzer, D. C., *et al.*, *New Engl. J. Med.*, 1957, 257, 356.

voluntary movement seen in some patients. The severe pain associated with muscle tenderness was a striking characteristic of the infection; and, coupled with this, many patients tended to become emotionally unstable. Evidence of involvement of the central nervous system was found in 148 cases (74%), and an equally high proportion (73%) had enlarged lymph nodes, particularly the posterior cervical group. Convalescence was remarkably slow, with a fluctuating course during which many of the previous symptoms recurred. Even after six weeks' convalescence many patients were having difficulty in getting back to a full day's work. The outbreak reported at Washington had very similar clinical characteristics, particularly during the course of the subacute stage. Several patients examined six months later had weakness of muscles and became easily fatigued. In another outbreak which occurred during 1956 in a small community in Florida about 150 cases were seen by local physicians.<sup>7</sup> Though the clinical picture resembled that of the Royal Free disease, the incidence of cranial-nerve lesions was low and the lympho-reticular system was unaffected.

The spinal fluid was normal in the patients seen during the outbreak at the Royal Free Hospital, and except for minor discrepancies this seems to be a constant feature in all these outbreaks. But all laboratory investigations to determine the cause have been unsuccessful. Many of the Royal Free cases were investigated by up-to-date virological methods, as indeed were those in the Washington series, but no conclusive evidence of a virus or other infectious agent has been found. For the time being, therefore, the aetiology remains a matter for conjecture. The nature and position of the lesion in the central nervous system is also not known, but the infection, irritative rather than destructive in nature, is evidently widespread. Electromyographic studies point to a myelopathic lesion without degeneration of the lower motor neurone, but in the absence of histological material the pathology will remain unknown.

### SUBLIMINAL ADVERTISEMENT

Some public anxiety has been caused by claims that it is possible to influence people's choice by exposing them to advertisements of which they are not aware. This is done by projecting the advertisements for very brief periods on the screen during a cinematic performance. What are the grounds for believing these claims? And what are the dangers to political life and mental health if such a method falls into unscrupulous hands? The credibility of the claims may be examined under two heads. First, is it possible for visual stimuli, though too brief to be reported by the

subject, yet to affect his behaviour? Secondly, if it is possible for them to affect his behaviour in a laboratory situation, are they a good means of conveying suggestions, like the hypnotic trance? There is a great deal of evidence on the first question.

It seems at first sight paradoxical, especially to those trained on the physiological notions of threshold, that external stimuli which are subliminal or subthreshold should have any effect at all on the central nervous system. It would seem that if the energy of a stimulus is really below the threshold in intensity and duration for the firing of a receptor, it is absurd to expect any change in the behaviour of an organism. Unfortunately the notion of threshold is not clear-cut, and it is complicated by the existence of random activity or "noise" in the end-organs themselves. Thus a receptor-organ will emit many messages which are not due to the arrival of signals from outside. A "decision" has to be made each time, by assessing probabilities, whether any message reaching the central nervous system is really a message arriving from outside the receptor or just a random discharge generated by the receptor itself. That is why a person, when in a sensitive condition, may be aware of stimuli when there are none, because the decision he has to make on statistical grounds will occasionally be wrong when a spontaneous random discharge passes the criteria set for accepting a message as veridical. These criteria are changeable. R. C. Oldfield<sup>1</sup> has demonstrated that there are fluctuations in sensory threshold, and C. I. Howarth and M. G. Bulmer<sup>2</sup> have shown that these fluctuations are closely related to the number of rejections or acceptances of stimuli in the preceding series. It is unlikely that the number of times a subject has said "Yes" or "No" can affect the physiological condition of an end-organ; much more probably the subject has in some way shifted his criterion of what he is to take as "seeing." Further work at the Institute of Experimental Psychology, Oxford, by Howarth and Treisman<sup>3</sup> supports even more clearly the view that the criterion is one of probability; they have shown that if a stimulus is expected, because of a warning signal at a fixed interval beforehand, the threshold for it is lowered.

It might be argued that these effects take place at a comparatively low level in the nervous system and that the messages which are there rejected are unlikely to affect behaviour greatly. But there is another line of evidence which complicates the notion of threshold still further. This has been produced by

<sup>1</sup> Oldfield, R. C., *Quart. J. exp. Psychol.*, 1955, 7, 101.

<sup>2</sup> Howarth, C. I., and Bulmer, M. G., *ibid.*, 1956, 8, 163.

<sup>3</sup> — and Treisman, M., *ibid.*, To be published.

<sup>4</sup> Jenkin, N., *Psychol. Bull.*, 1957, 54, 100.

<sup>5</sup> Stein, K. B., *J. Personality*, 1953, 21, 467.